

## **RESPONSE AND REQUEST FOR RECONSIDERATION**

### Support.

The amendments here presented are the same amendments made in the PCT prosecution. Support is found in original claim 6 and in the specification on page 14.

### Response.

The present invention, as amended, relates a lubricant, specifically suitable for a direct fuel injected, crankcase-scavenged two-stroke engine, using (b-2) a Mannich dispersant present in an amount of 0.5 to 8.0 percent, in combination with (b-1), a condensation product of a monocarboxylic acid and amine or ammonia, and also (d) an antioxidant in an amount of 0.5 to 2.0 percent.

The Examiner had rejected claims 1 through 7 as anticipated by Blythe (WO 93/03120). Blythe teaches a method of lubricating a two-cycle internal combustion engine wherein the lubricant composition contains a Mannich dispersant and a dispersant which is the reaction product of an acid and an amine. The dispersant is present in an amount of 5 to 25 percent with 20 percent being a preferred amount. Although the teachings of Blythe are superficially similar to the present use of a Mannich dispersant, (b-2), in combination with the (b-1) dispersant, there is no mention or suggestion in Blythe of the use of an antioxidant at the presently claimed levels in combination with (b-1) and (b-2). Blythe merely discloses disclosed on page 51 "oxidation-inhibiting agents," one of several optional components, with no indication of types or amounts.

In response to the above amendments and remarks, the International Examiner had indicated that the claims were (at least) novel over the cited references, including Blythe. The International Examiner there stated, "The claims as amended can be considered novel over the document WO93/03120 (or D1), which also represents the closest prior art, since it does not disclose a specific composition comprising all the components in the specified amount, in particular the antioxidant." Accordingly, it is submitted that the present claims are novel.

Furthermore, the data in the Specification, in the PCT prosecution, and especially in the accompanying Declaration demonstrates that the present invention is non-obvious. Kindly refer first to Examples 1 and 3 and their performance as reported in the Table on page 21 of the specification. This information is also presented below:

Table 1

Component, %	Ex. 1 (comparative)	Ex. 3 (invention)
(a) Oil	48.8	48
(b-1) Condensate: isostearic acid + amine	4	5
(b-2) Mannich base (dispersant) (incl. 34% oil)	<b>0</b>	<b>5</b>
(c) Solvent	28	28
(d) Aromatic amine antioxidant	1	1
Na phenol/glyoxylic reaction product (incl. 40% oil)	0	0.6
Polybutenyl amino phenol (incl. 40% oil)	6.6	6.0
Succinimide dispersant (incl. 30% oil)	<b>6.2</b>	<b>0</b>
Polyisobutene	5	8
Glycerol monooleate	0.3	0.34
Rust inhibitor	0.06	0.06
Optimax 150 HP Engine Test Results (50 hour test)		
Top Ring Heavy Carbon	3%	0%
Second Ring Heavy Carbon	1.2%	0%

The table in the Specification reports a variety of test results focusing on the benefits of using a Mannich base dispersant as opposed to a succinimide dispersant. Of most practical importance are the ring carbon deposits, which are reproduced in the table above. The data from the specification shows that when the conventional succinimide dispersant is replaced by the Mannich base dispersant of the present invention, there is a significant reduction in deposition of carbon in the piston rings. The reductions in ring carbon deposits can prevent ring jacking and subsequent engine seizure.

Turning to the matter of the unexpected benefits of employing 0.5 to 2.0 percent of an antioxidant, the Examiner's attention is directed to the additional data presented in the attached Declaration from Dr. Brent Dohner. This data is summarized in the table below.

Table 2

Component, %	Ex A (comp)	Ex B (comp)	Ex C (comp)	Ex D (comp)	Ex E
(a) Oil	100	93	89	92	87
(b-1) Condensate: isostearic acid + amine (including 12% diluent oil)	0	5	5	0	5
(b-2) Mannich base (disp) (including 34% diluent. oil)	0	0	6	6	6
(d) Aromatic amine antioxidant	0	2	0	2	2
MHT TEOST test results (mg deposit)	121	69.6	57.2	40.6	18.1

The MHT TEOST test is the ASTM D 7907B test measuring the amount of deposit from the test lubricant, generated on a steel rod heated at 285 °C for 24 hours.

The test results show that all three required components of the present invention must be present in order to provide the present good results in terms of low deposits. While any two of the three required components do provide some improvement in deposit formation, all three are required for good results. In particularly, Ex C is representative of the teachings of Blythe in that it contains both components (b-1) and (b-2) but without the antioxidant. The deposit formation is nearly 4 times as severe as in Example E, which contains all three components of the present invention. It should be noted that the good performance of Example E is not simply the result of the presence of antioxidant. Comparative Examples B and D contain the same amount of the same antioxidant but show much worse deposits. It appears that the combination of components (b-1), (b-2), and (d) together provide the unexpectedly good results.

#### Conclusion.

For the foregoing reasons it is submitted that the present claims are novel, unobvious, and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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